Name: Catheryn Long, Margi Henderson, and Kim Lara

LESSON PLAN

Name: Catheryn Long, Margi Henderson, and Kim Lara **Date:** February 15, 2012
Subject: Science **Grade Level:** 5 **Length of Lesson:** 90 minutes
Lesson Plan Title: A Recipe For Traits
Content Standard: 4.0 Heredity
Materials & Resources:

Per Group: copies of student pages, crayons or colored pencils, tape, 1 envelope to hold the 18 dog pictures, 1 envelope to hold the DNA strands, colored paper for preparing DNA strips (4 colors needed), 18 dog pictures, ELMO, teacher station, whiteboard, dry erase markers
Per Student: drawing paper

PLANNING

Unit Goal(s):

GLE 0507.4.1 Describe how genetic information is passed from parents to offspring during reproduction.

GLE 0507.4.2 Recognize that some characteristics are inherited while others result from interactions with the environment.

Learning Objectives:

The learner will:

- Show how each organism inherits a unique combination of traits, by creating a recipe from known traits.
- Draw an illustration depicting a dog with specific traits from his/her recipe
- Create an alternate illustration of the same dog in a different environment.

Checks for Understanding:

0507.4.1 Explain how genetic information is transmitted from parents to offspring.
SPI's:
0507.4.1 Recognize that information is passed from parent to offspring during reproduction.
0507.4.2 Distinguish between inherited traits and those that can be attributed to the environment.

Enduring Understandings:

CONCEPT(S):

- Genetics are the study of inherited traits.
- Inherited refers to traits you get from your parents.
- Traits are personal characteristics.
- Traits are sometimes mutated or adapted to accommodate the environment.
- The genotype is the actual genetic make up of an individual, phenotype is what that individual looks like.

ESSENTIAL QUESTIONS:

- Where do traits in living things come from?

- How are traits passed on?
- Are any two dogs alike? Point out that every dog shares some traits in common with others, but each has an overall combination of traits that is unique.
- What effects does the environment have on people/animals? Do all things depend on heredity?
- What role will genetic engineering play in your future?

Interdisciplinary Connections:

Math: Students can gather the number of different traits that occur within the classroom and create a graph to represent the data. (ex: hair color, eye color)

GLE 0506.5.1 Make, record, display and interpret data and graphs that include whole numbers,
decimals, and fractions
SPI 0506.5.1 Depict data using various representations, including decimal and/or fractional data.

Social Studies: Discuss how cultures could be influenced by genetics.

Learning Expectations: 1.01 Understand the diversity of human cultures.
5.1.spi.1. recognize components of American culture (i.e., holidays, language, clothing, food, art, music, and religion)

Language Arts: Using a graphic organizer, begin prewriting a story about your dog that has been created. Then move on drafting. During the revising step, students will pay special attention to run-on sentences. Students will move on to editing and evaluating their story. The stories will then be collected and published into a class book.

GLE 0501.1.3 Demonstrate knowledge of Standard English sentence structure.
GLE 0501.3.3 Know and apply the steps of the writing process: prewriting, drafting, revising, editing, evaluating, and publishing.
SPI 0501.1.9 Select the most appropriate method to correct a run-on sentence (i.e., conjunctions, semicolons, periods to join or separate elements) within context.
SPI 0501.3.1 Identify the audience for which a text is written.
SPI 0501.3.2 Identify the purpose for writing (i.e., to entertain, to inform, to share experiences, to persuade, to report).
SPI 0501.3.13 Complete a graphic organizer (i.e., clustering, listing, mapping, webbing) to group ideas for writing.

INSTRUCTION

INTRODUCTION or Anticipatory Set

Time: 7 minutes

Engage:

While passing out the materials for the lesson, play *Who Let the Dogs Out* by Baha Men (1 minute)

Part I: Ask students to hold up fingers from 0 to 5 on how comfortable they are with identifying traits in people and animals. ***(FACT #5: Fist to Five)***

Part II: In the small envelope, there are 18 pictures of different dogs. Ask table groups to sort their DOG envelope by the trait of their choosing. They may sort by fur color, tail length, spots, etc (3 minutes)

Ask each table group to write what traits they chose and why on their whiteboard. ***(FACT # 75: Whiteboarding)*** (3 minutes) We will discuss some of the traits that were chosen as a class.

BODY (Activities & Practice)

Activities

Time: 75 minutes

Explore I: (5 minutes)

Using a guided inquiry ask groups to resort their DOG envelope into groups based on a single given trait. One trait will be given to each table group.

- Legs
- Ears
- Head (muzzle)
- Body
- Tail

Explain I: (10 minutes)

Students will discuss with the whole class their results from their trait sort. We will decide as a class whether they have been sorted correctly, and resort if necessary. Teacher will demonstrate the group's findings on the ELMO using the teacher set of pictures. The class will also talk about what trait is being used to sort and why.

Explore II: (25 minutes)

In pairs the students will use the DNA strips in their envelopes to determine the recipe for their unique dog. Starting with the first strip selected they will match it to the trait for body shape and write the trait down on a separate piece of paper that matches their DNA strip. They will continue this process for each trait until they have one trait for each category. After determining their dog's trait, they will tape the DNA strips together to form the dogs unique DNA strand. The students will draw a picture of their dog on the paper provided.

Explain II: (15minutes)

Students will discuss the similarities and differences of the dogs that they created among themselves. Students will be asked if there is anything that all of the dogs have in common such as the color of the fur or eyes, otherwise known as the phenotype. We will discuss the fact that the offspring receives pieces of DNA from each parent and how the pieces come together to form a complete unique strand, otherwise known as the genotype. As a class we will complete a table determining how many of each trait is represented in the dogs that the class has created.

Extend: (20 minutes)

Using the data in our table, the class will look at some statements concerning the traits of dogs,

other animals and people. We will discuss whether we are able to determine if the statements are true or false and tell how the data or the lesson supports our answers. Allow the students to discuss how the data verifies their opinion. ***(FACT #10: Data Match)***

Considering the data we collected from our dogs, which of the following statements are true?

1. No 2 dogs have exactly the same traits.
2. Animals get their traits from their parents.
3. If a parent has blue eyes, the offspring will have blue eyes.
4. The environment can contribute to the traits an animal has.
5. Typically, dogs have 4 legs.
6. Typically, people will have brown hair.
7. All people/animals will have traits in common with others of their species.
8. Most short leg dogs have long bodies.
9. If a person has blond hair, then their eyes will be blue.
10. All animals will have tails.

Practice/Assessment

Time: **5 minutes (in-class; will be taken home to be completed)**

Given a collection of traits for a mother and a father, ask the students to create an offspring. They will write the DNA strand (represented by symbols) and draw a picture of the offspring.

The completed papers will be collected and reviewed the following day.

CLOSURE

Time: 5 minutes

- Collect the pictures and unique DNA strips of the dogs created by the students to display in the classroom.
- Have students clean up their work areas and put away materials.
- Restate the objectives of the lesson. The teacher will allow time for any questions.

ASSESSMENT

Evaluation:

Informal:

The teacher will circulate around the room to listen to the discussions at the tables and to ensure that the groups are selecting and determining traits correctly. The teacher will determine the students understanding and correct any misconceptions through discussions during the explain portion of the lesson.

Formal:

The teacher will review the unique offspring created by the student in the take-home assignment to determine that the student understands that the offspring will have some traits from each parent and the offspring DNA strand will be unique.

Alternative and/or Supplemental Activities/Extensions:

Online Activities:

Pass the genes, please

DragonflyTV, Dog Breeding

Differentiation – Accommodations for Individual Learners:

Directions are available in Spanish

References:

A Recipe for Traits:
http://teach.genetics.utah.edu/content/begin/traits/recipe.html

Phenotype and Genotype definitions:
http://www.exploringnature.org/db/detail.php?dbID=22&detID=2290

Video: http://youtu.be/1uaPs8sxqB0

Dog Pictures:
http://en.wikipedia.org/wiki/Dog
http://animal-world.com/dogs/Toy-Dog-Breeds/ToyDogBreeds.php
http://www.dogbreedinfo.com/chihuahua.htm
http://spadogbotanicals.com/
http://news.sciencemag.org/sciencenow/2010/04/good-dogs-live-longer.html
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http://www.havanesedogsinformation.com/
http://www.tiptoptens.com/2011/05/30/most-popular-dog-breeds-friendly-dogs/
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